PATENT APPLICATION

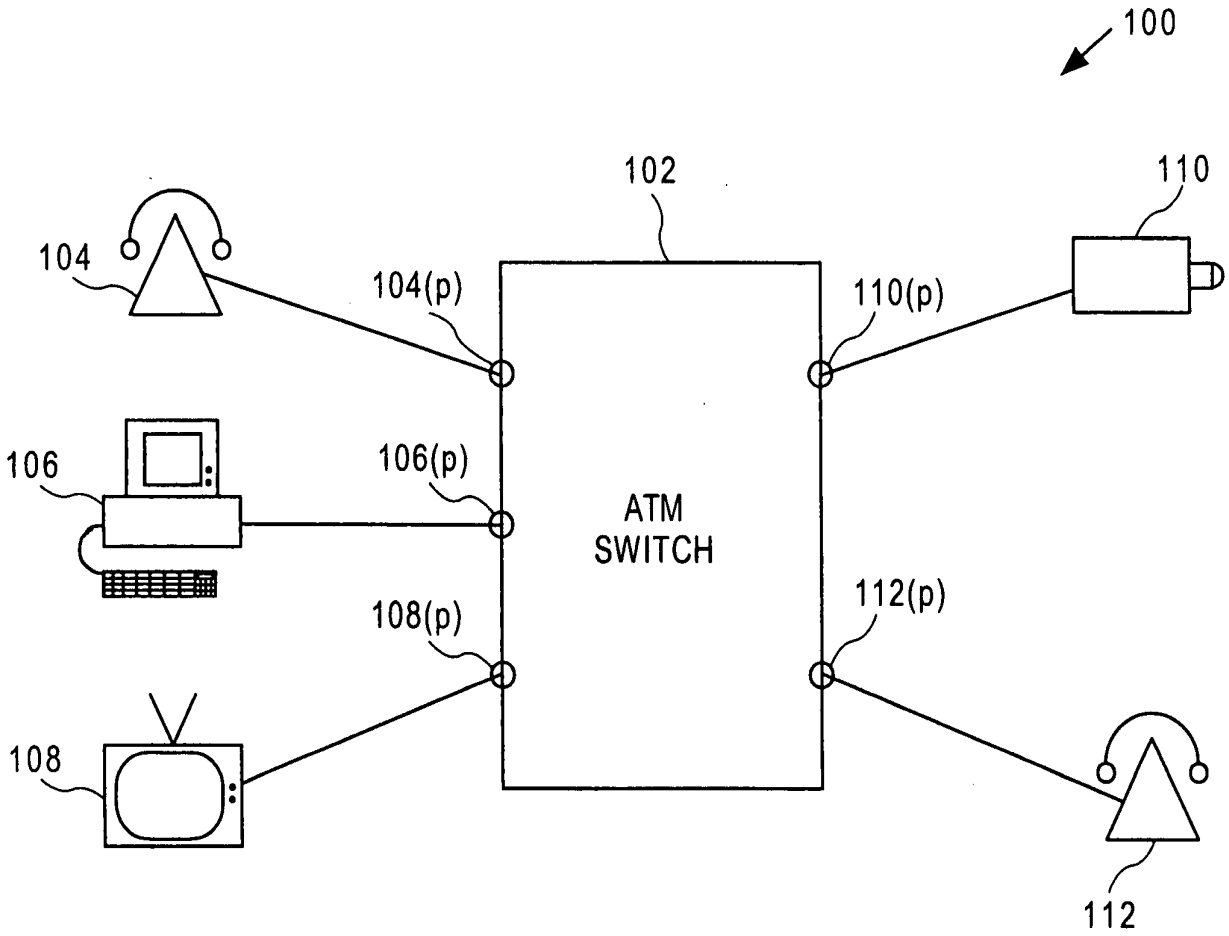
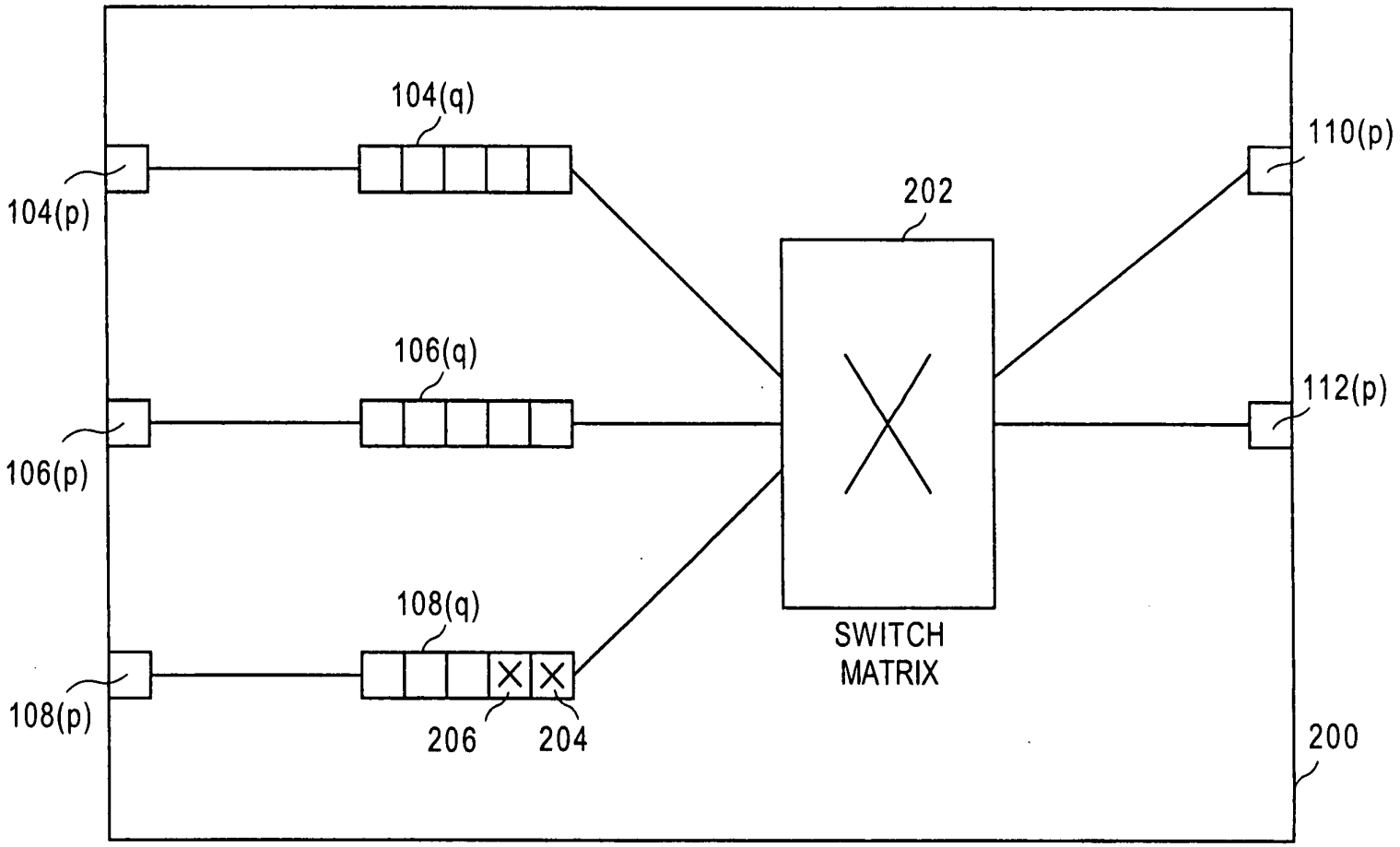


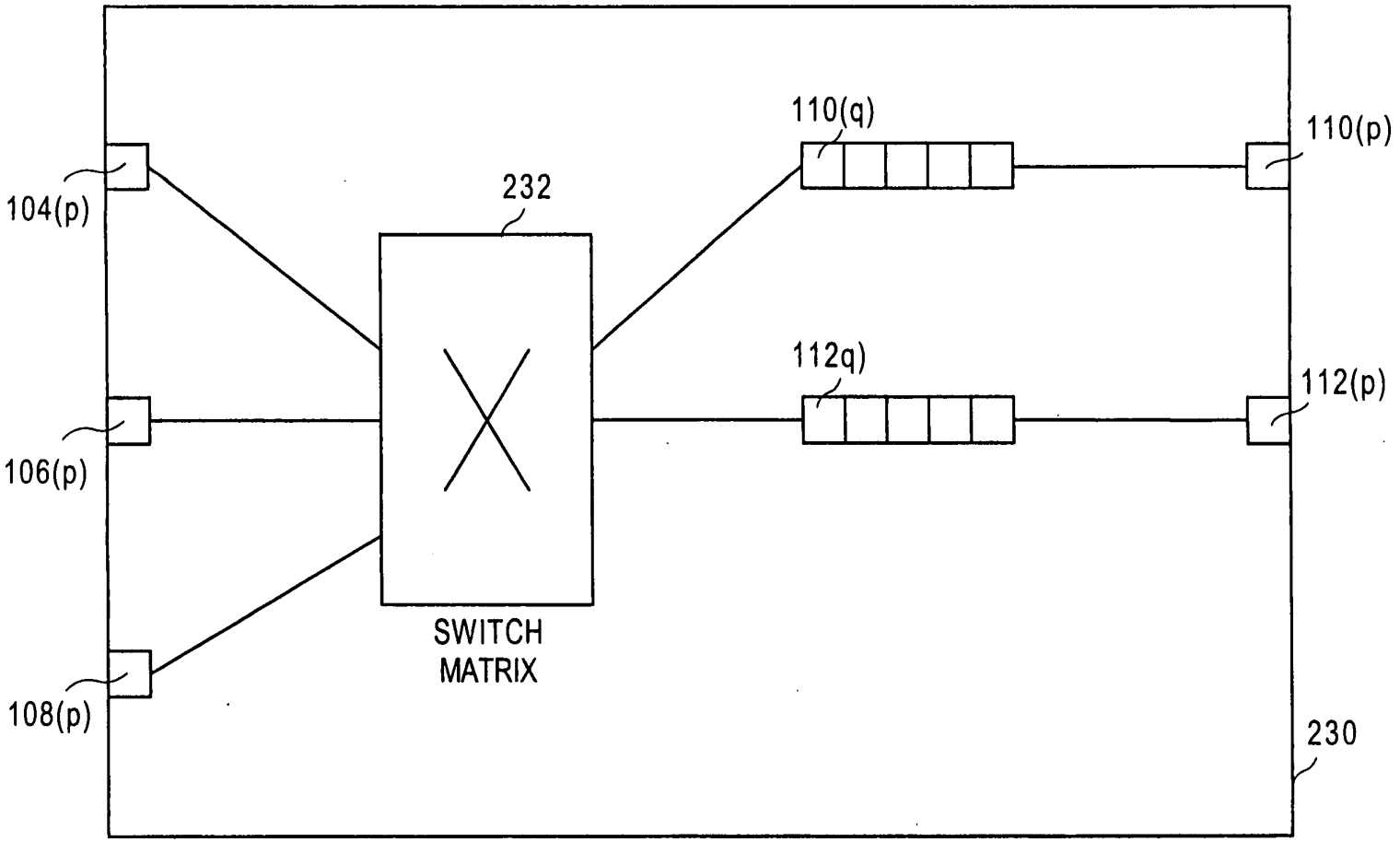
FIG. 1
(prior art)

PAGE 1 OF 1



INPUT BUFFER SWITCH

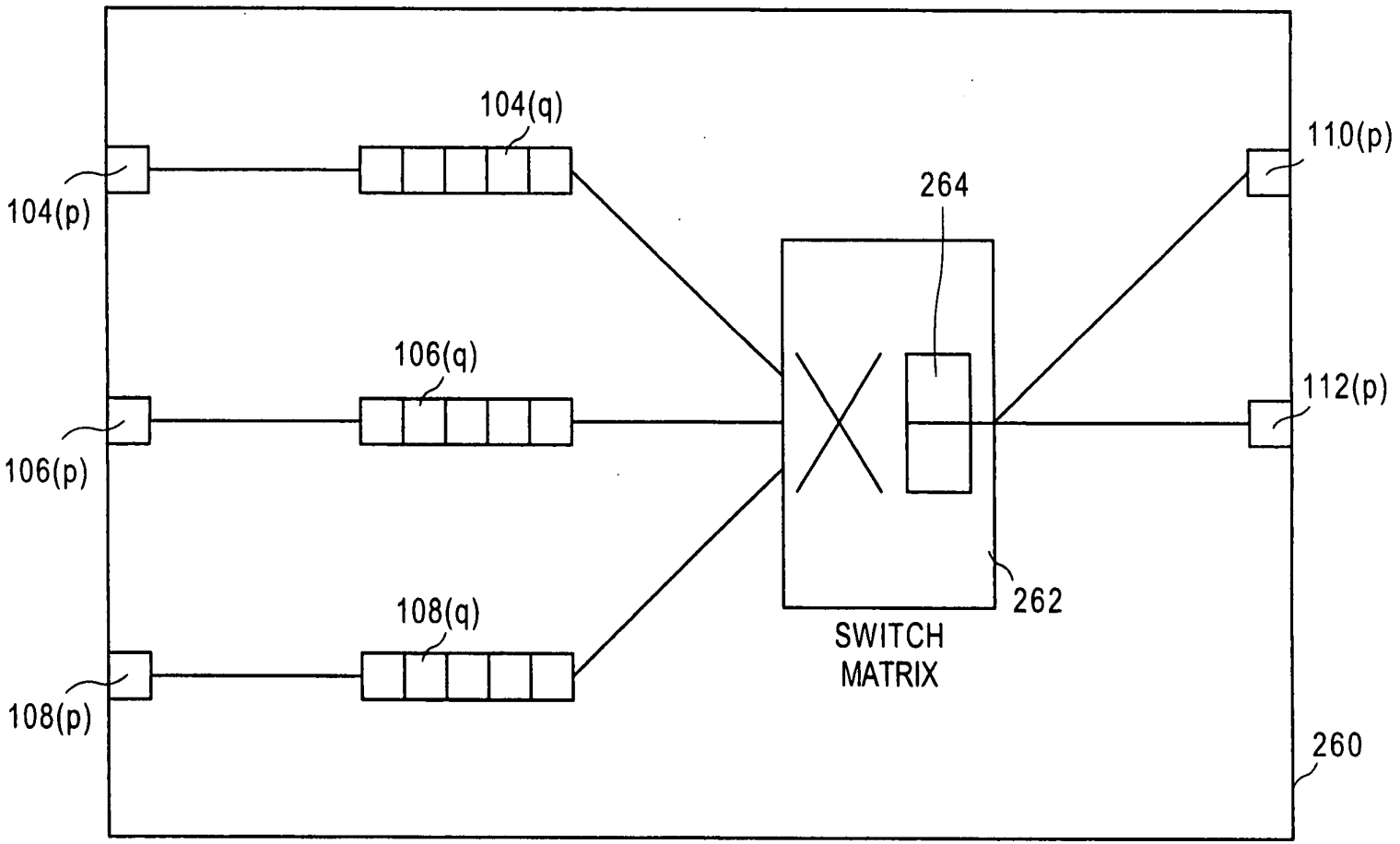
FIG. 2A
(prior art)



OUTPUT BUFFER SWITCH

FIG. 2B
(prior art)

PATENT APPLICATION



HYBRID SWITCH

FIG. 2C
(prior art)

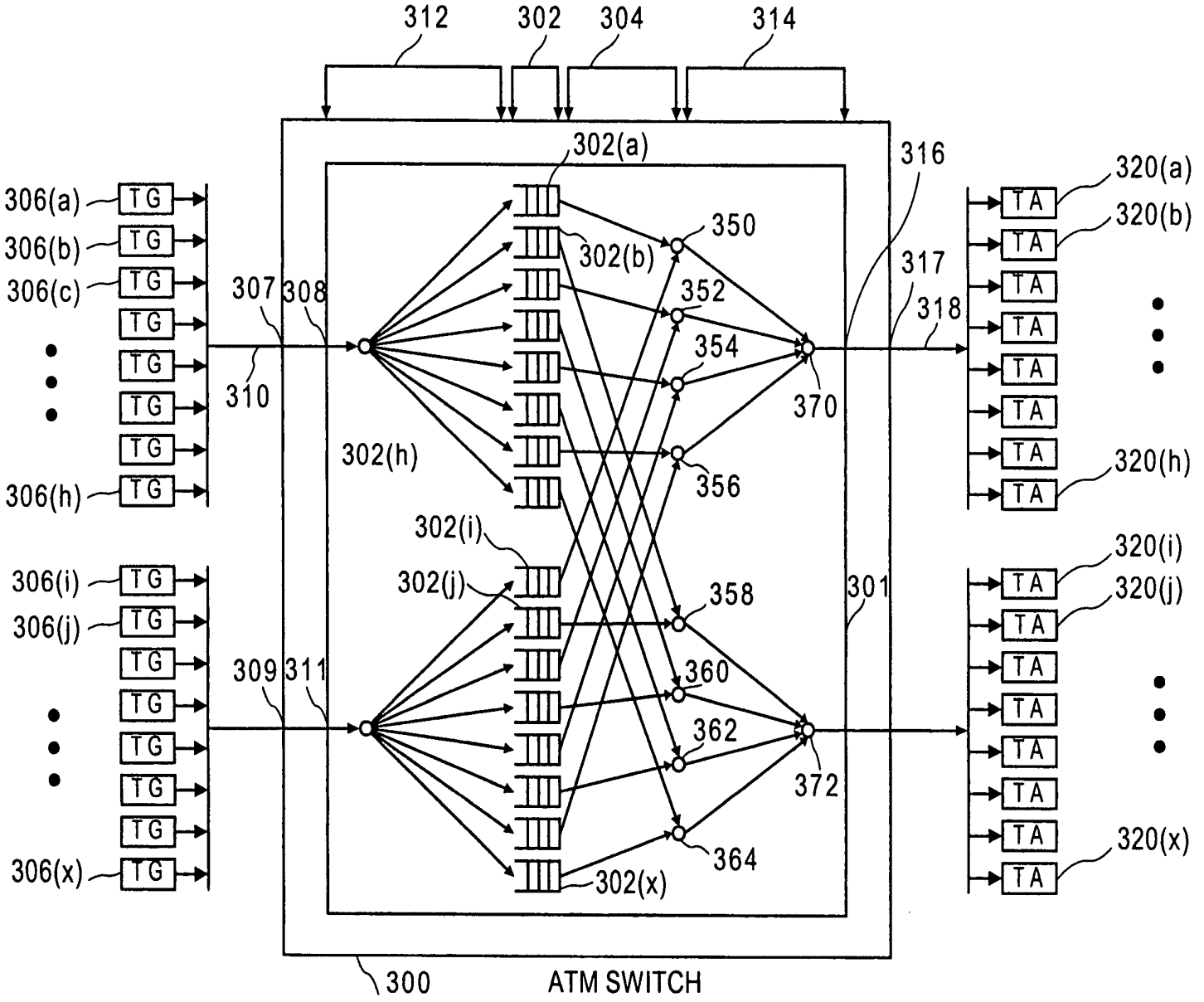

312
302
304
314
302(a)
316
306(a)
306(b)
306(c)
306(h)
TG
307
308
310
302(h)
350
302(b)
352
354
356
370
317
318
320(a)
320(b)
320(h)
TA
302(i)
302(j)
306(i)
306(j)
306(x)
309
311
358
360
362
364
372
302(x)
301
320(i)
320(j)
320(x)
300
ATM SWITCH

FIG. 3

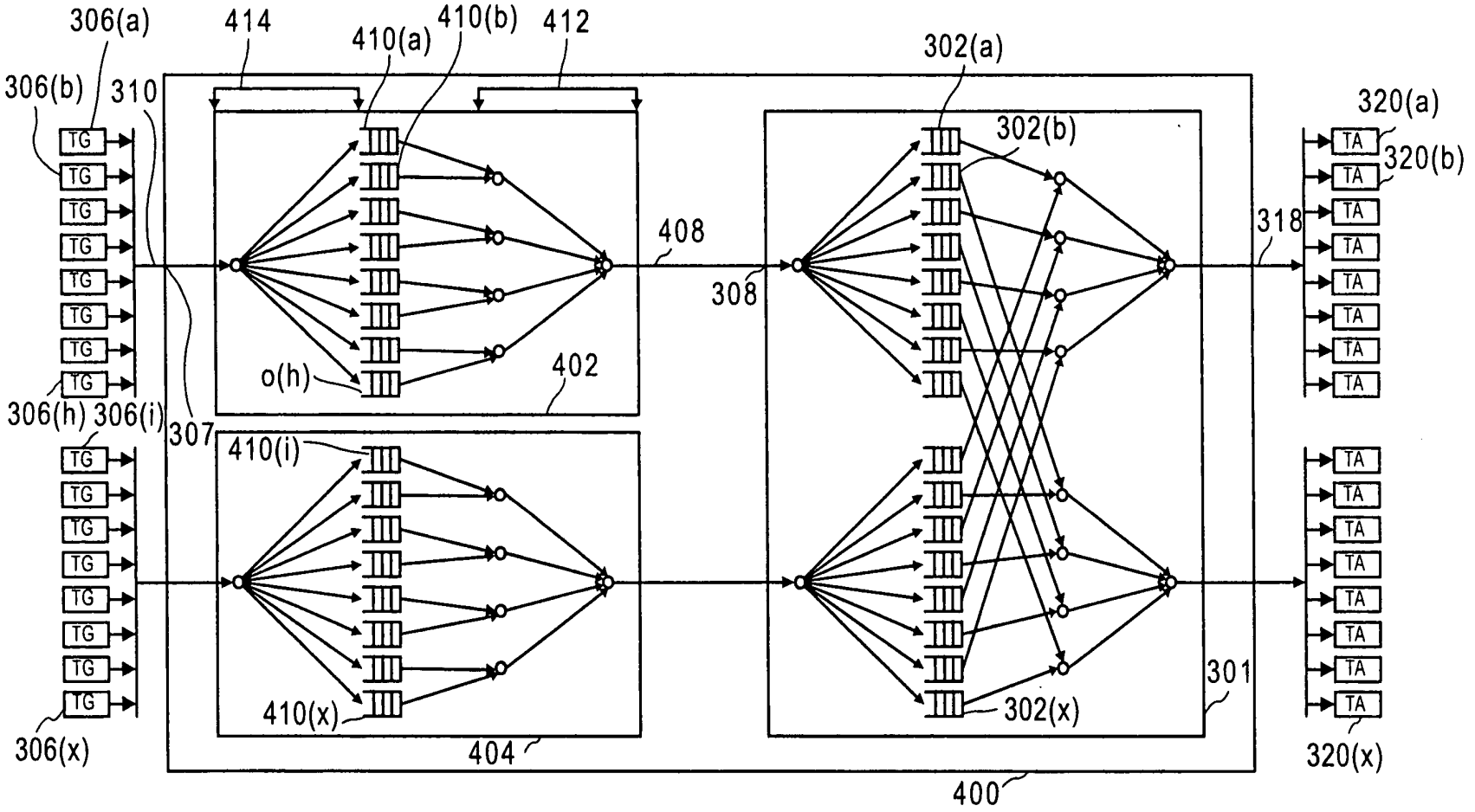

306(a)
306(b)
310
414
410(a)
410(b)
412
302(a)
302(b)
320(a)
320(b)
TG
TA
408
318
308
o(h)
402
306(h)
306(i)
307
410(i)
410(x)
404
301
302(x)
306(x)
320(x)
400

FIG. 4

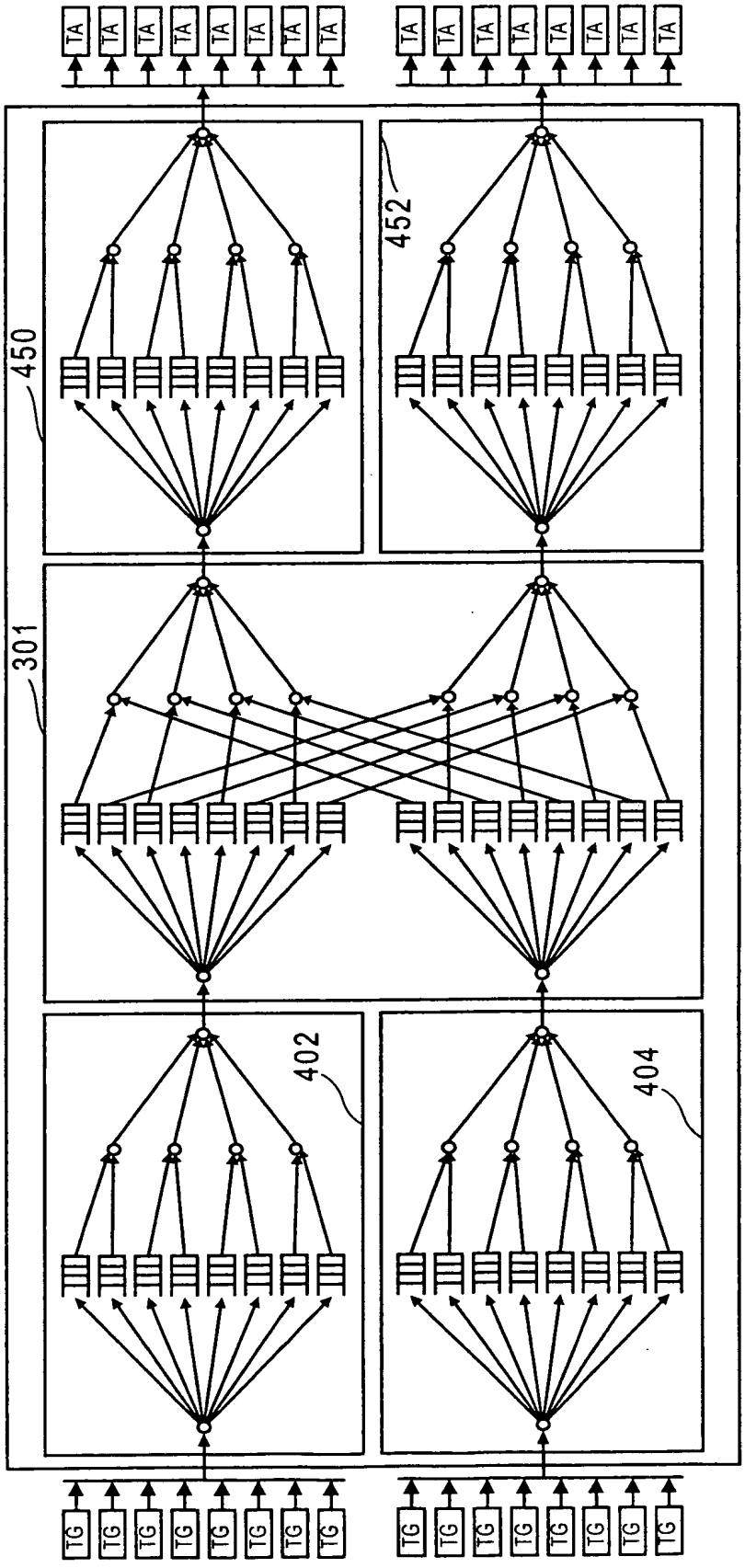


FIG. 5

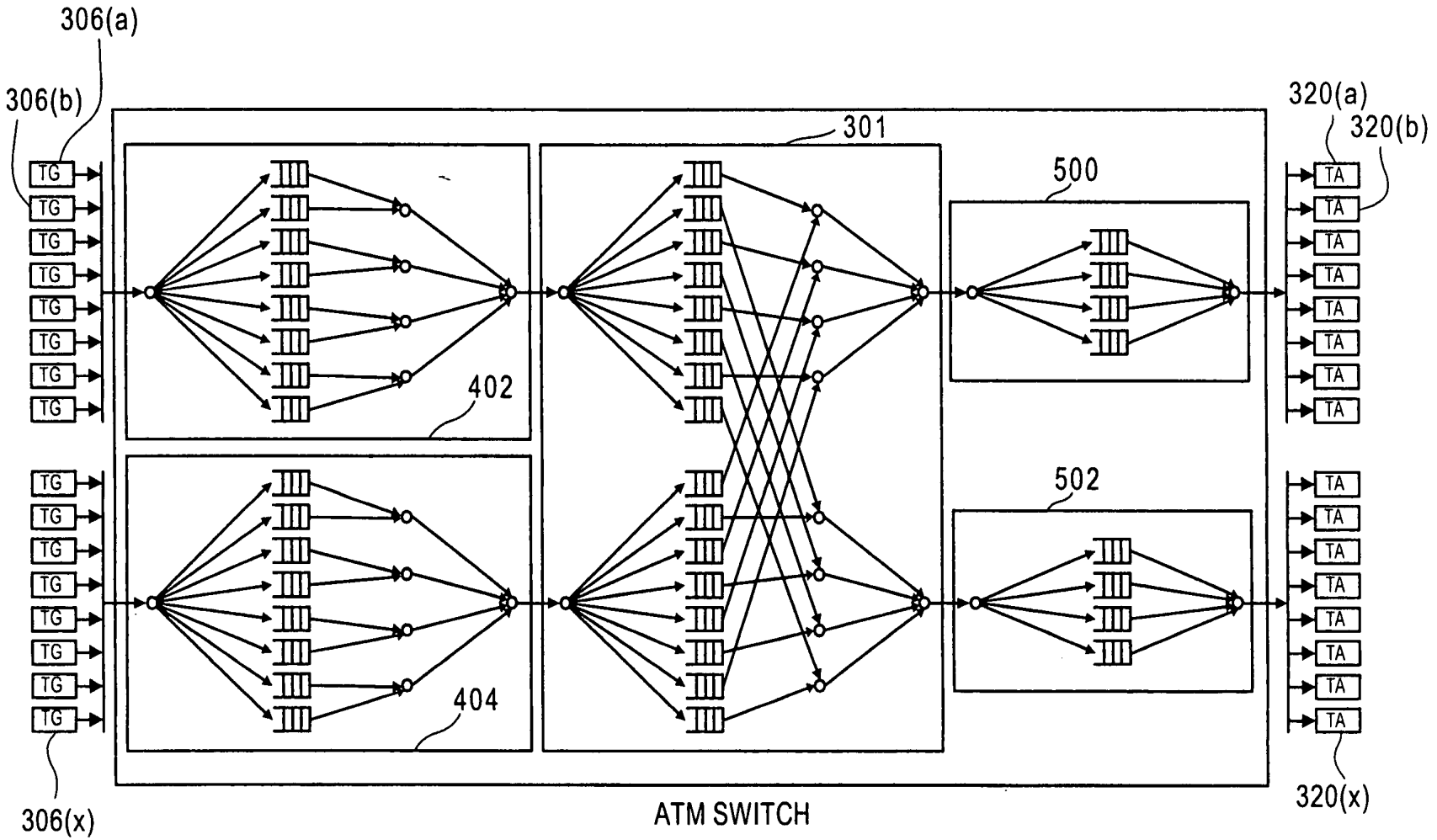

306(a)
306(b)
TG
301
320(a)
320(b)
500
TA
402
502
404
306(x)
320(x)
ATM SWITCH

FIG. 6

PCT/US99/13260

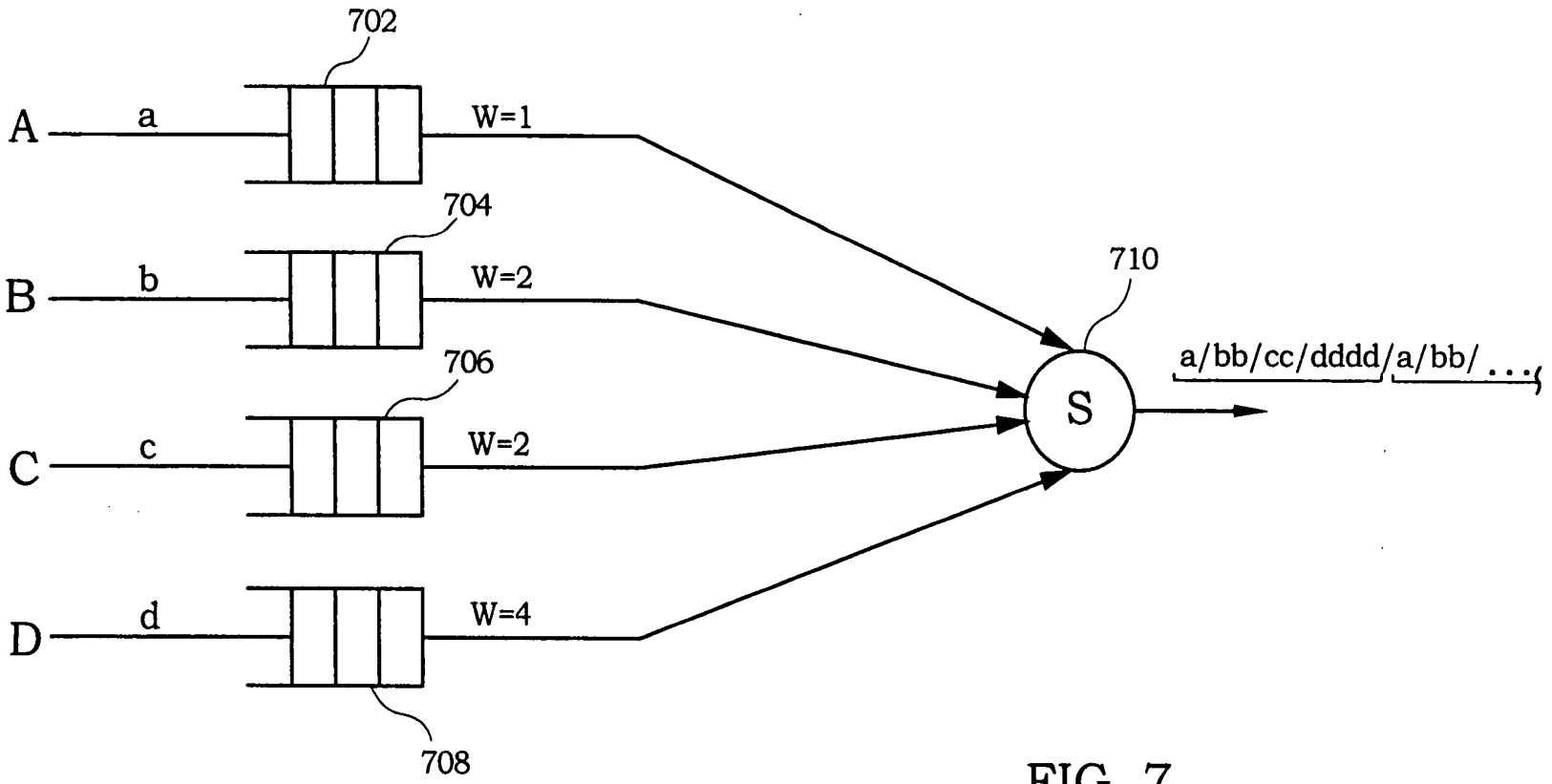


FIG. 7

PCT/US97/15826

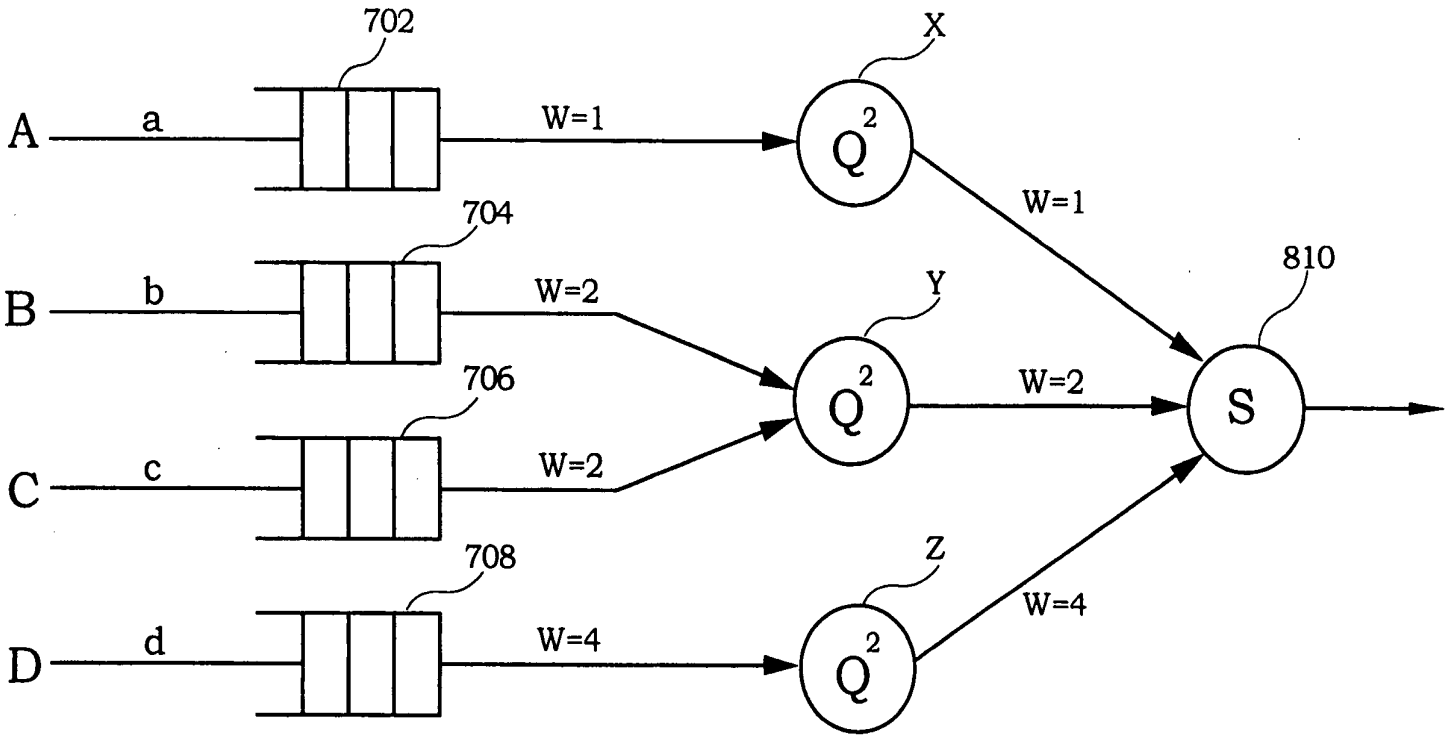


FIG. 8A

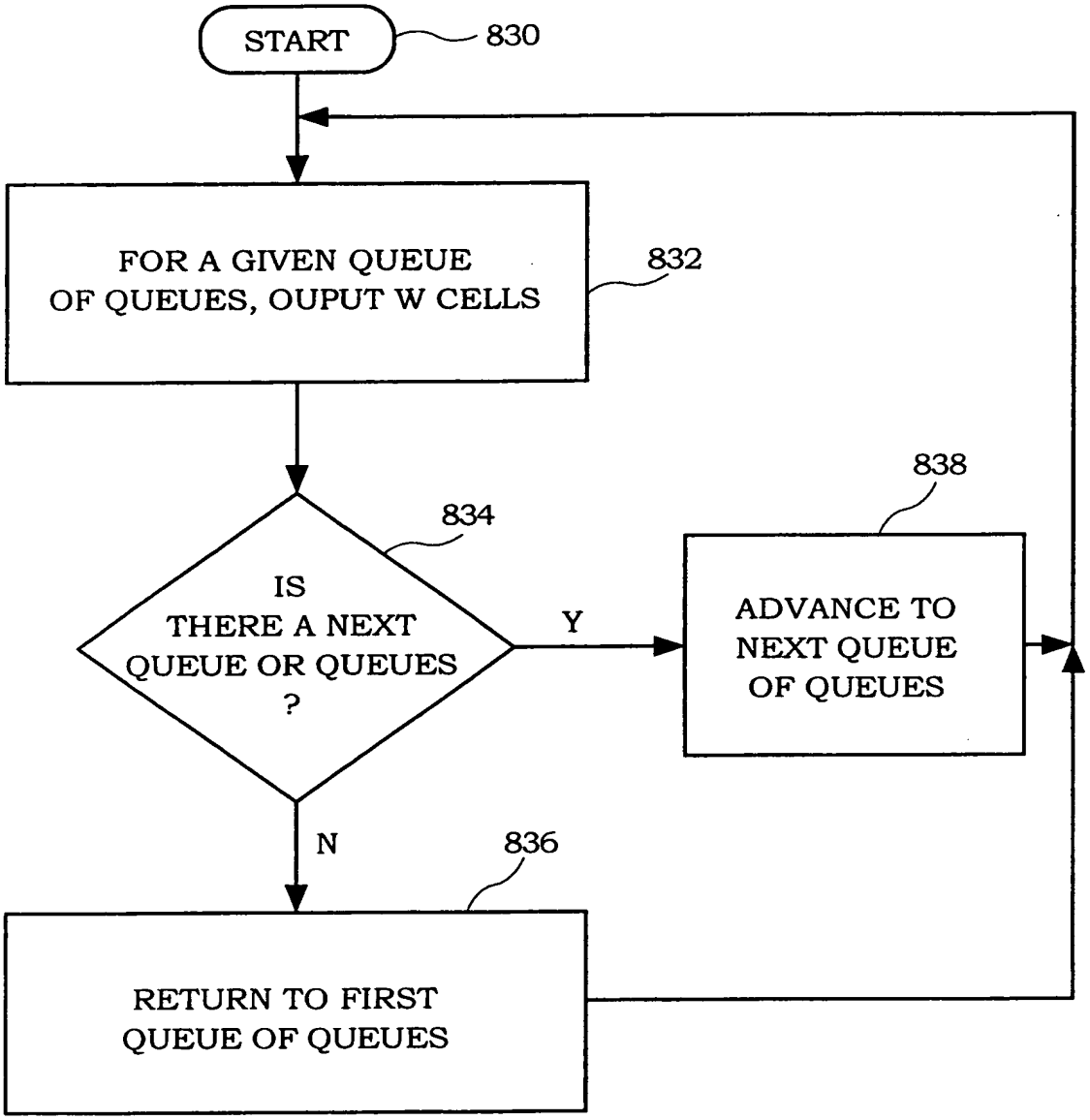

START
830
FOR A GIVEN QUEUE OF QUEUES, OUPUT W CELLS
832
IS THERE A NEXT QUEUE OR QUEUES ?
834
Y
ADVANCE TO NEXT QUEUE OF QUEUES
838
N
836
RETURN TO FIRST QUEUE OF QUEUES

FIG. 8B

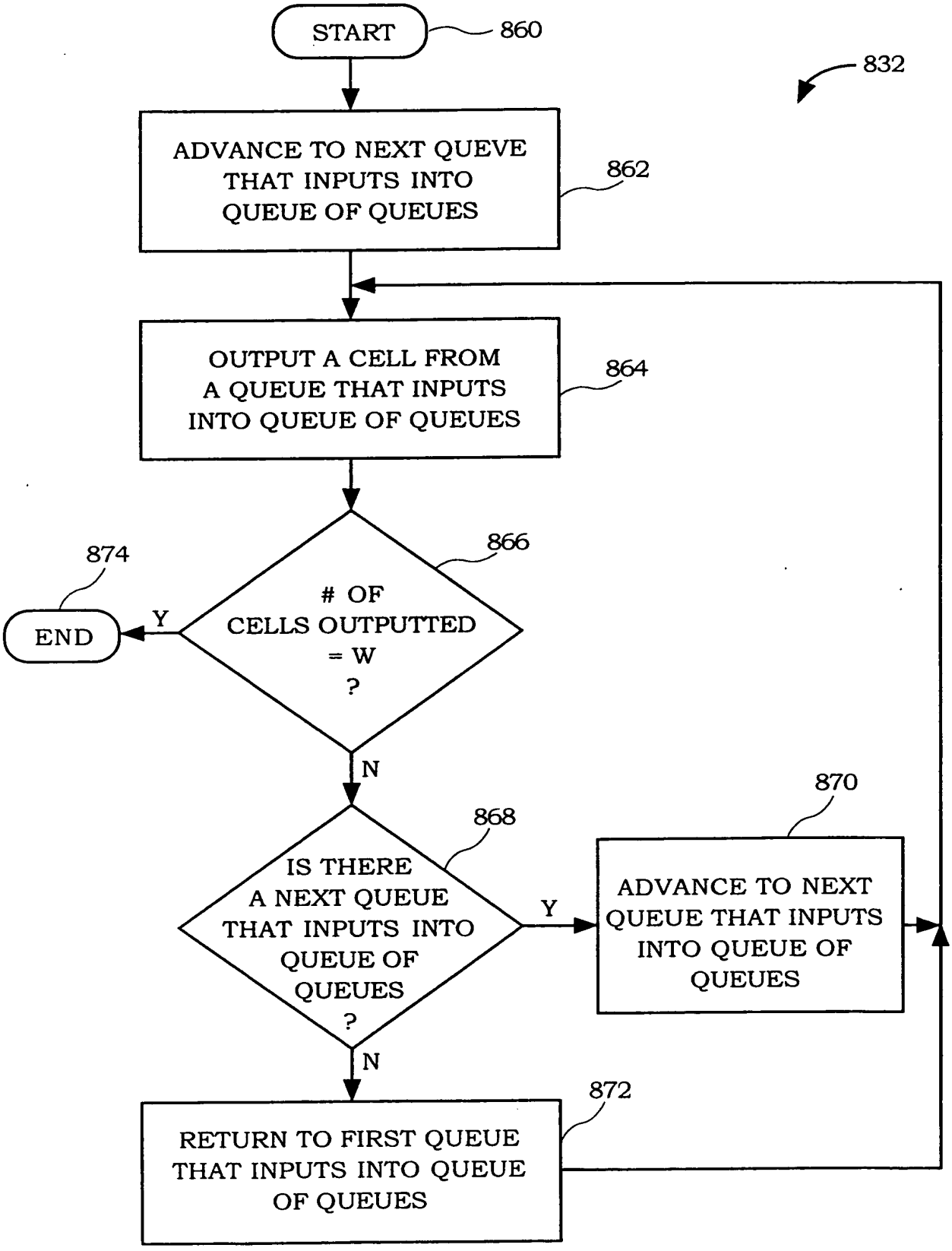

START
860
832
ADVANCE TO NEXT QUEVE THAT INPUTS INTO QUEUE OF QUEUES
862
OUTPUT A CELL FROM A QUEUE THAT INPUTS INTO QUEUE OF QUEUES
864
OF CELLS OUTPUTTED = W ?
866
874
END
Y
N
IS THERE A NEXT QUEUE THAT INPUTS INTO QUEUE OF QUEUES ?
868
Y
870
ADVANCE TO NEXT QUEUE THAT INPUTS INTO QUEUE OF QUEUES
N
872
RETURN TO FIRST QUEUE THAT INPUTS INTO QUEUE OF QUEUES

FIG. 8C

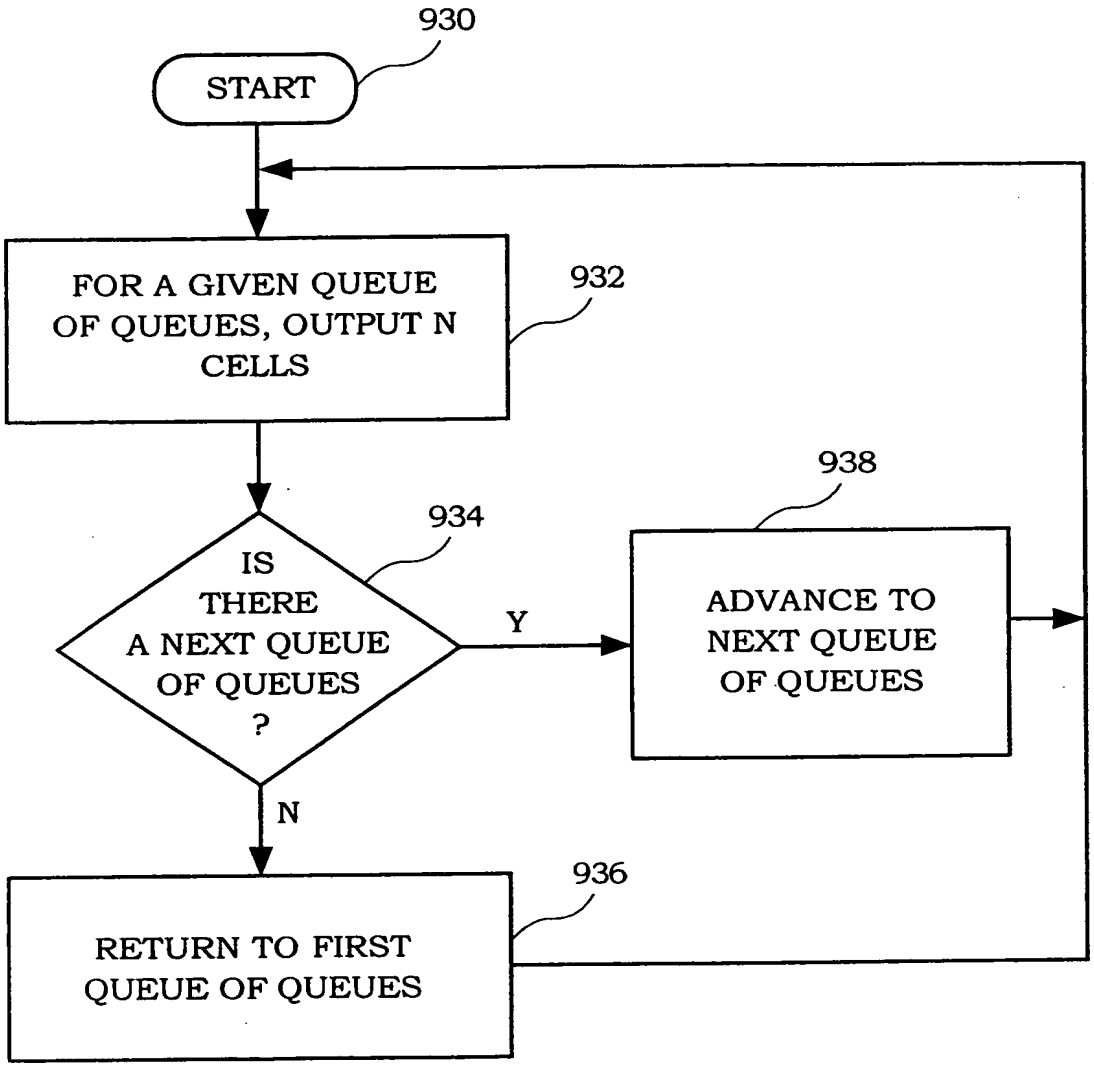

930
START
FOR A GIVEN QUEUE OF QUEUES, OUTPUT N CELLS
932
IS THERE A NEXT QUEUE OF QUEUES ?
934
Y
938
ADVANCE TO NEXT QUEUE OF QUEUES
N
936
RETURN TO FIRST QUEUE OF QUEUES

FIG. 9A

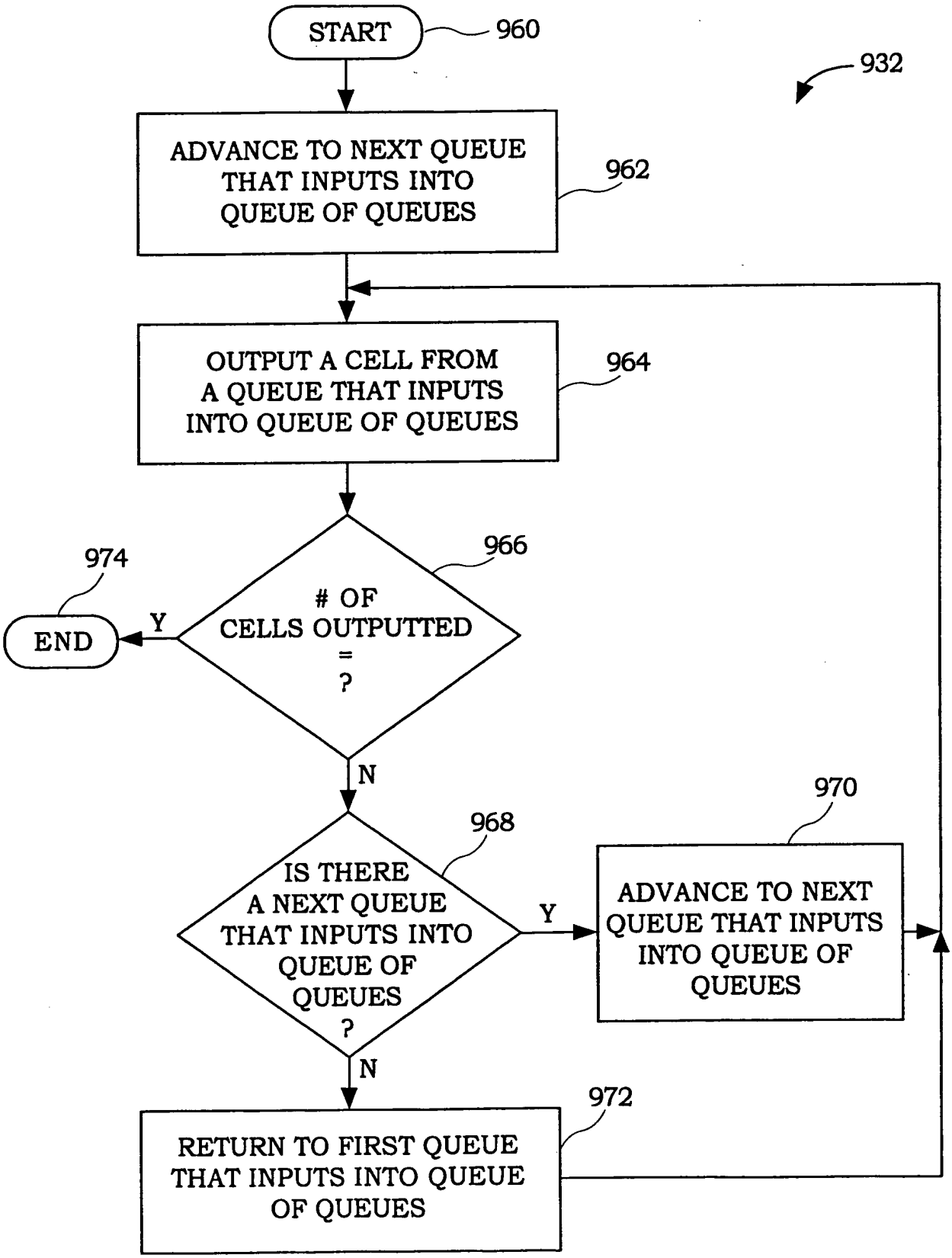

START
960
932
ADVANCE TO NEXT QUEUE THAT INPUTS INTO QUEUE OF QUEUES
962
OUTPUT A CELL FROM A QUEUE THAT INPUTS INTO QUEUE OF QUEUES
964
OF CELLS OUTPUTTED = ?
966
974
END
Y
N
IS THERE A NEXT QUEUE THAT INPUTS INTO QUEUE OF QUEUES ?
968
Y
970
ADVANCE TO NEXT QUEUE THAT INPUTS INTO QUEUE OF QUEUES
N
RETURN TO FIRST QUEUE THAT INPUTS INTO QUEUE OF QUEUES
972

FIG. 9B

Queue of Queue	Static Weight	Dynamic Weight														Row #
X	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Y	2	2	2	1	1	0	0	0	0	2	1	1	0	0	0	2
Z	4	4	4	4	3	3	2	1	0	4	4	3	3	2	1	3

Output	X	Y	Z	Y	Z	Z	Z	X	Y	Z	Y	Z	Z			4

Column #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	

FIG. 10

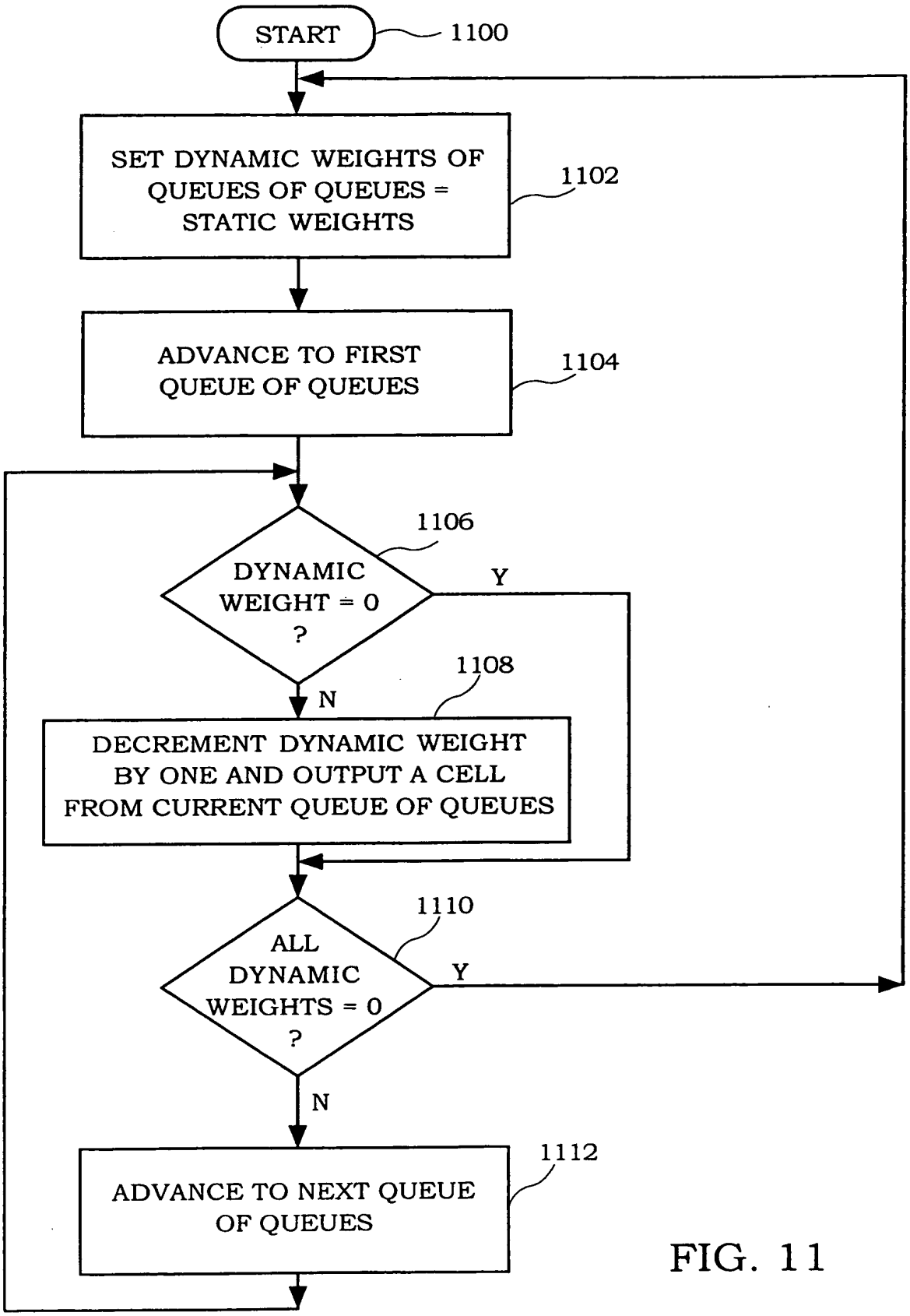

START
1100
SET DYNAMIC WEIGHTS OF QUEUES OF QUEUES = STATIC WEIGHTS
1102
ADVANCE TO FIRST QUEUE OF QUEUES
1104
1106
DYNAMIC WEIGHT = 0 ?
Y
N
1108
DECREMENT DYNAMIC WEIGHT BY ONE AND OUTPUT A CELL FROM CURRENT QUEUE OF QUEUES
1110
ALL DYNAMIC WEIGHTS = 0 ?
Y
N
1112
ADVANCE TO NEXT QUEUE OF QUEUES

FIG. 11

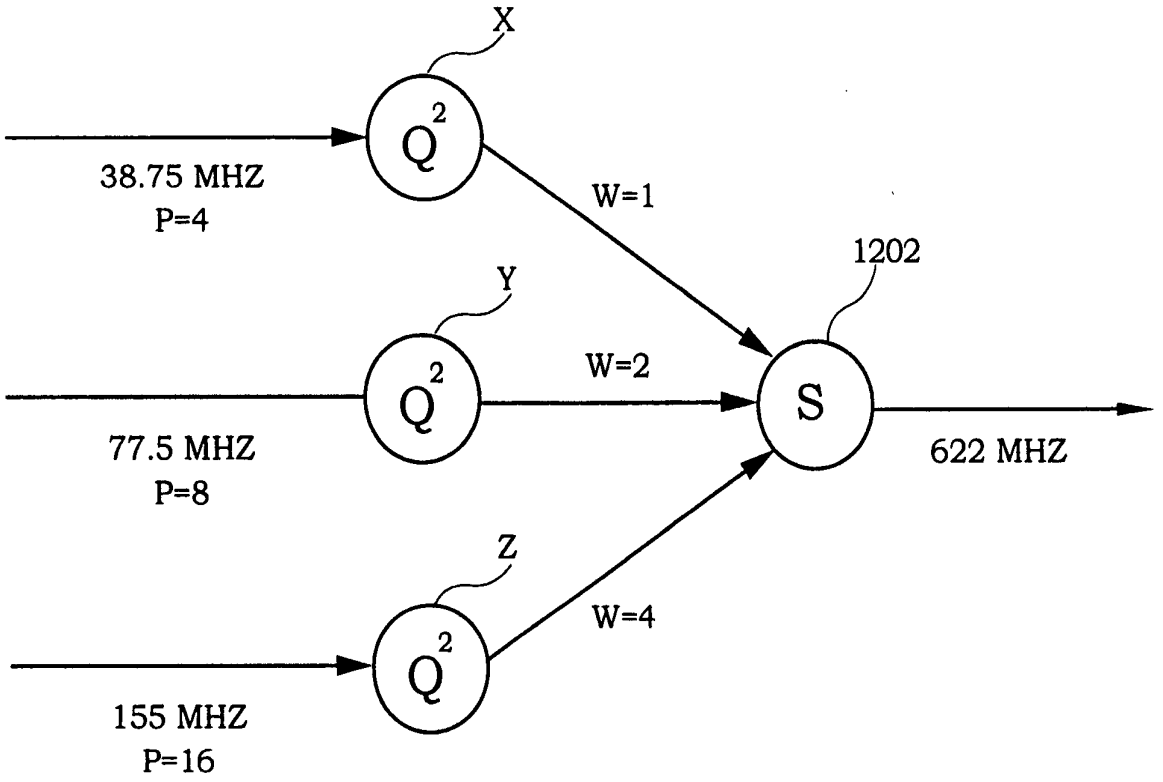

X
Q2
38.75 MHZ
P=4
W=1
1202
Y
Q2
W=2
S
77.5 MHZ
P=8
622 MHZ
Z
W=4
Q2
155 MHZ
P=16

FIG. 12

Queue of Queue	Static Period	Static Period Current Count	Row #
X	15	14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 15 14 13	1
Y	7	6 5 4 3 2 1 0 7 6 5 4 3 2 1 0 0 7 6 5 4 3 2 1 0 7 6 5 4 3 2 1 0 7 6	2
Z	3	2 1 0 3 2 1 0 0 3 2 1 0 3 2 1 0 0 3 2 1 0 3 2 1 0 3 2 1 0 3 2 1 0 3	3
Output		z y z z x y z z y z x y z	4
Column #		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34	

FIG. 13

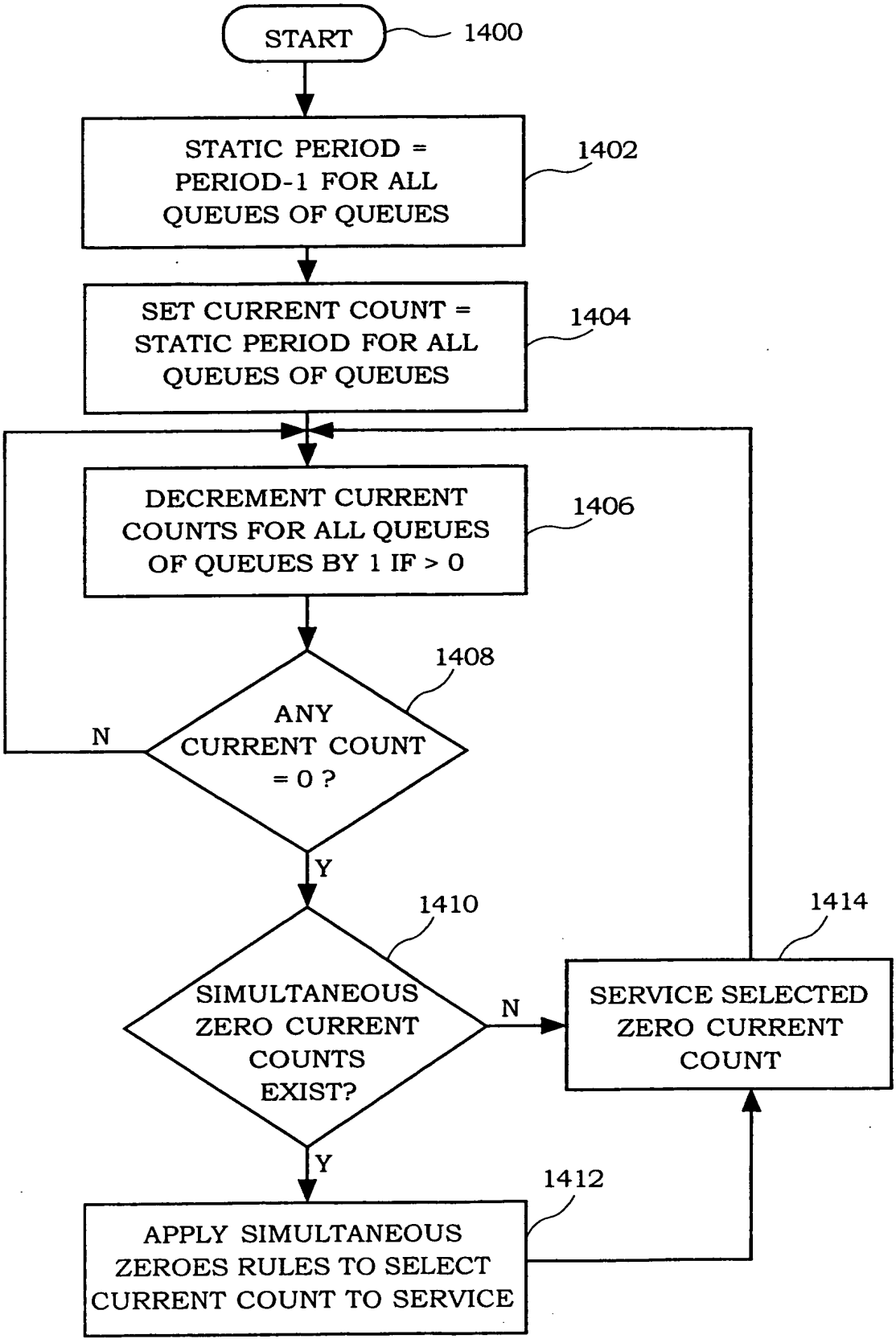

START
1400
STATIC PERIOD = PERIOD-1 FOR ALL QUEUES OF QUEUES
1402
SET CURRENT COUNT = STATIC PERIOD FOR ALL QUEUES OF QUEUES
1404
DECREMENT CURRENT COUNTS FOR ALL QUEUES OF QUEUES BY 1 IF > 0
1406
ANY CURRENT COUNT = 0 ?
1408
N
Y
SIMULTANEOUS ZERO CURRENT COUNTS EXIST?
1410
N
Y
SERVICE SELECTED ZERO CURRENT COUNT
1414
APPLY SIMULTANEOUS ZEROES RULES TO SELECT CURRENT COUNT TO SERVICE
1412

FIG. 14

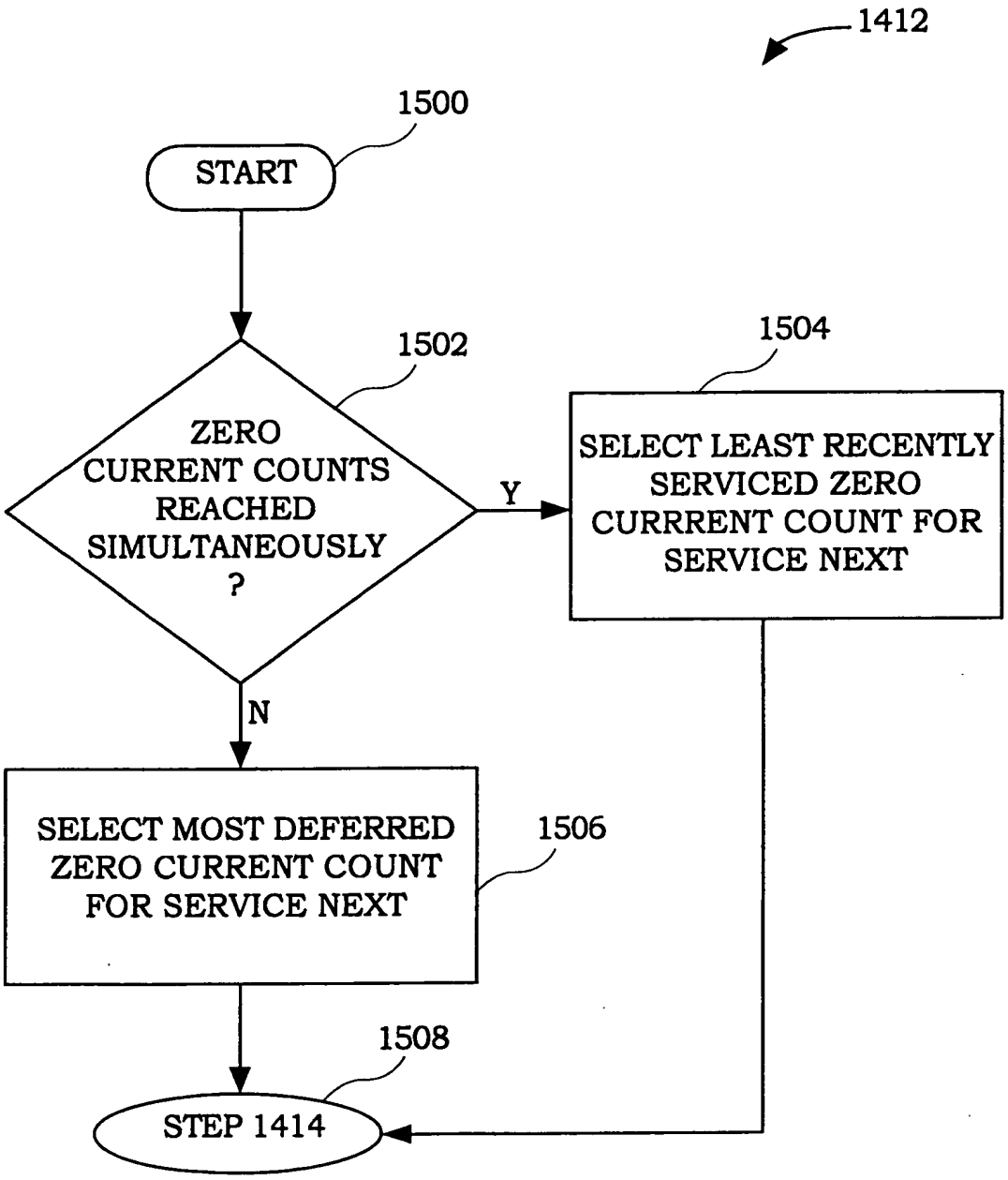

1412
1500
START
1502
ZERO CURRENT COUNTS REACHED SIMULTANEOUSLY ?
Y
1504
SELECT LEAST RECENTLY SERVICED ZERO CURRRENT COUNT FOR SERVICE NEXT
N
SELECT MOST DEFERRED ZERO CURRENT COUNT FOR SERVICE NEXT
1506
1508
STEP 1414

FIG. 15

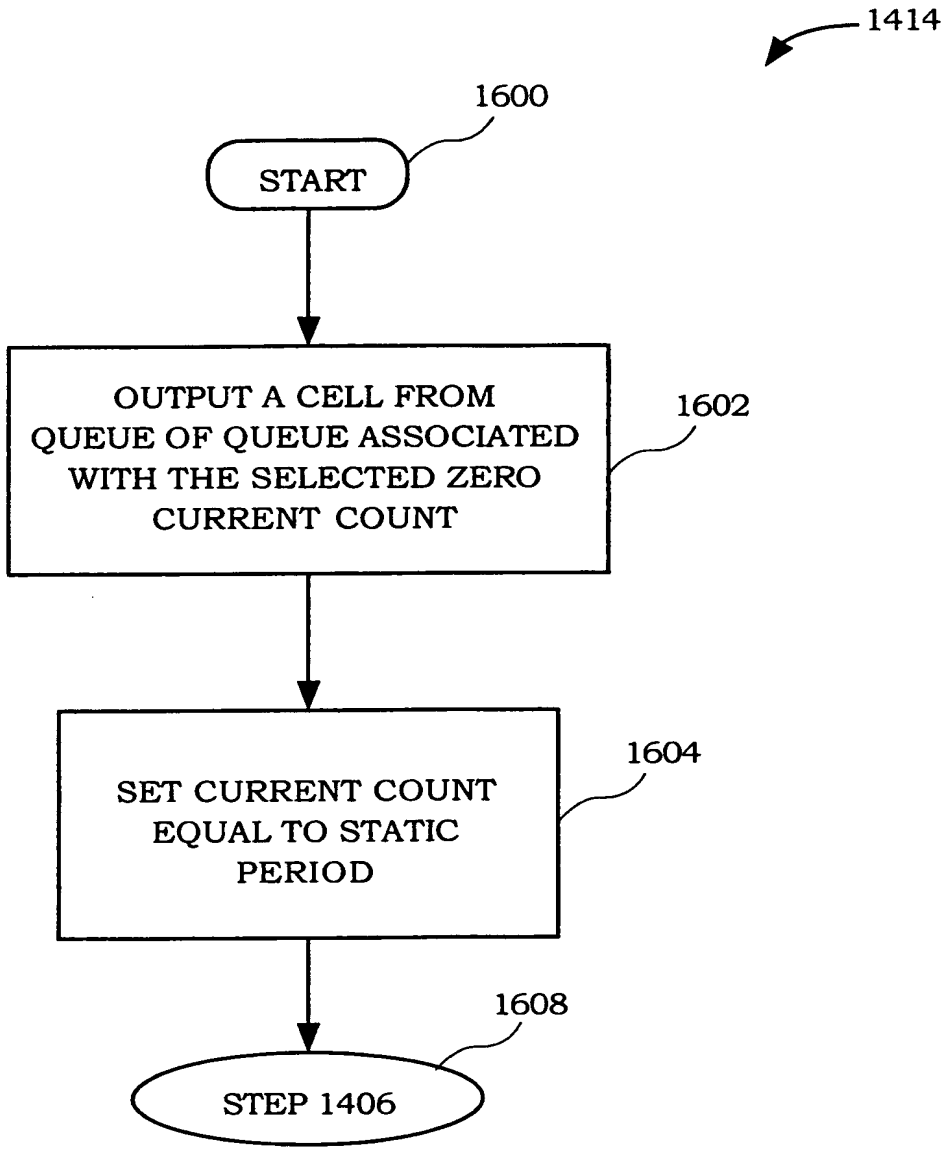

1414
1600
START
OUTPUT A CELL FROM QUEUE OF QUEUE ASSOCIATED WITH THE SELECTED ZERO CURRENT COUNT
1602
SET CURRENT COUNT EQUAL TO STATIC PERIOD
1604
1608
STEP 1406

FIG. 16

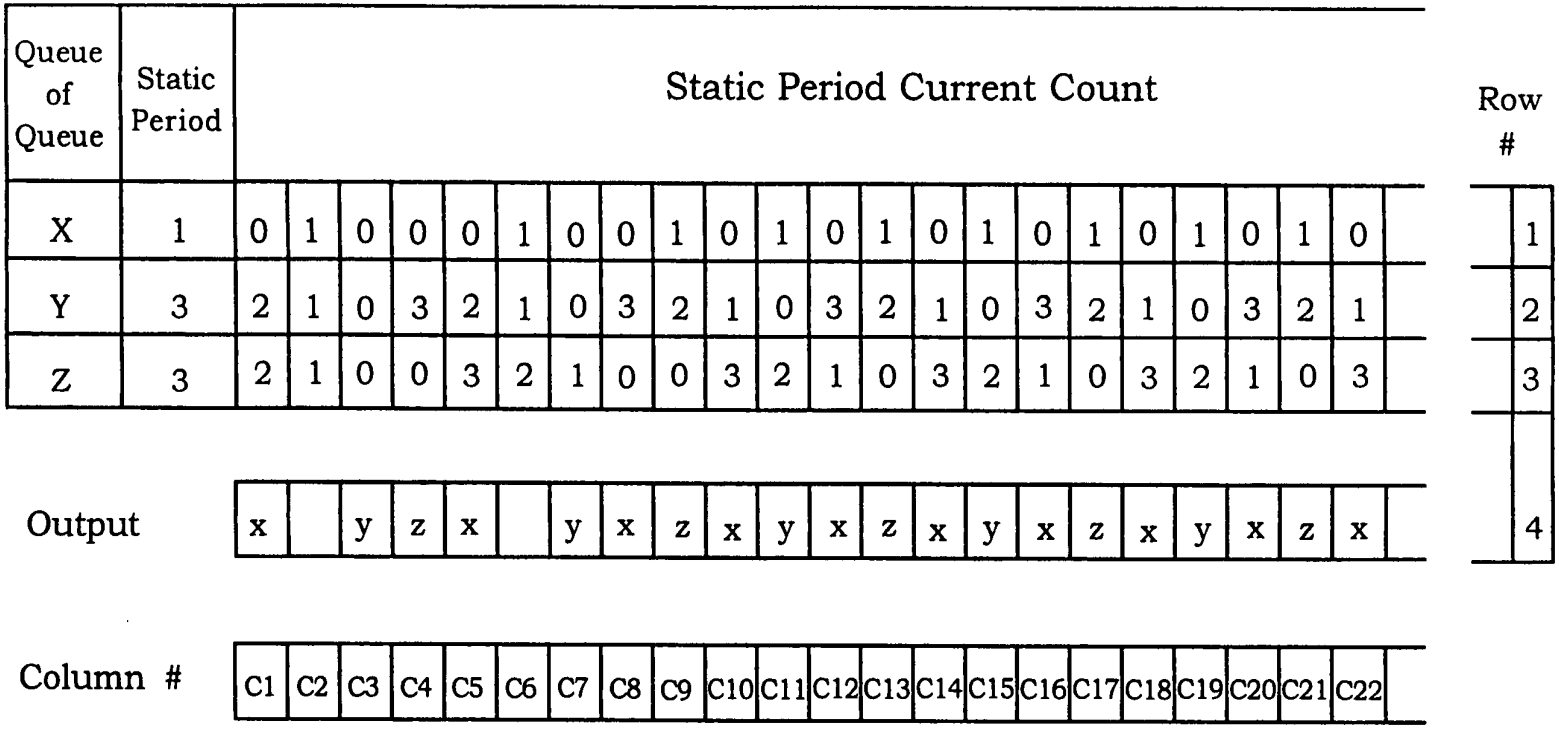

Queue of Queue
Static Period
Static Period Current Count
Row #
X 1 0 1 0 0 0 1 0 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1
Y 3 2 1 0 3 2 1 0 3 2 1 0 3 2 1 0 3 2 1 0 3 2 1 2
Z 3 2 1 0 0 3 2 1 0 0 3 2 1 0 3 2 1 0 3 2 1 0 3 3
Output x y z x y x z x y x z x y x z x y x z x y x z x 4
Column # C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18 C19 C20 C21 C22

FIG. 17